

U.S. DEPARTMENT OF ENERGY
ENERGY STAR® QUALIFIED WATER HEATERS
PARTNER RESOURCE GUIDE



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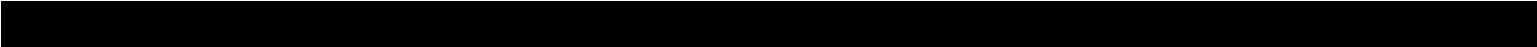
This Partner Resource Guide is designed to help you understand and promote ENERGY STAR qualified water heaters. Partners are free to use any of the text, charts, and images in Web sites, print advertisements, in-store promotional materials, and other marketing materials. The Guide is divided into two sections:

- Section I **CONSUMER INFORMATION** includes consumer messaging on water heating, as well as an overview of the features and benefits of each water heating technology eligible to earn the ENERGY STAR.

- Driving Consumer Demand.....1
- Water Heater Technologies at a Glance.....3
- Choosing the Right Technology.....4

- Section II **MARKET INFORMATION** summarizes the current state of the water heating market, highlights the aggregate savings potential of ENERGY STAR qualified water heaters, and outlines the criteria for ENERGY STAR qualified water heaters.

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SECTION I: CONSUMER INFORMATION—DRIVING CONSUMER DEMAND

DRIVING CONSUMER DEMAND

Increasing sales of ENERGY STAR qualified water heaters requires effective consumer education to build confidence in the technologies. This is a multi-step process, including:

1. **AWARENESS.** Homeowners discover the importance of planned water heater replacement and the availability of ENERGY STAR qualified water heaters.
2. **KNOWLEDGE.** Homeowners learn about the new water heating technologies and identify the ones that represent the best fit for their home and lifestyle.
3. **ACTION.** Homeowners rely on the ENERGY STAR label to find a quality water heater for a planned replacement.



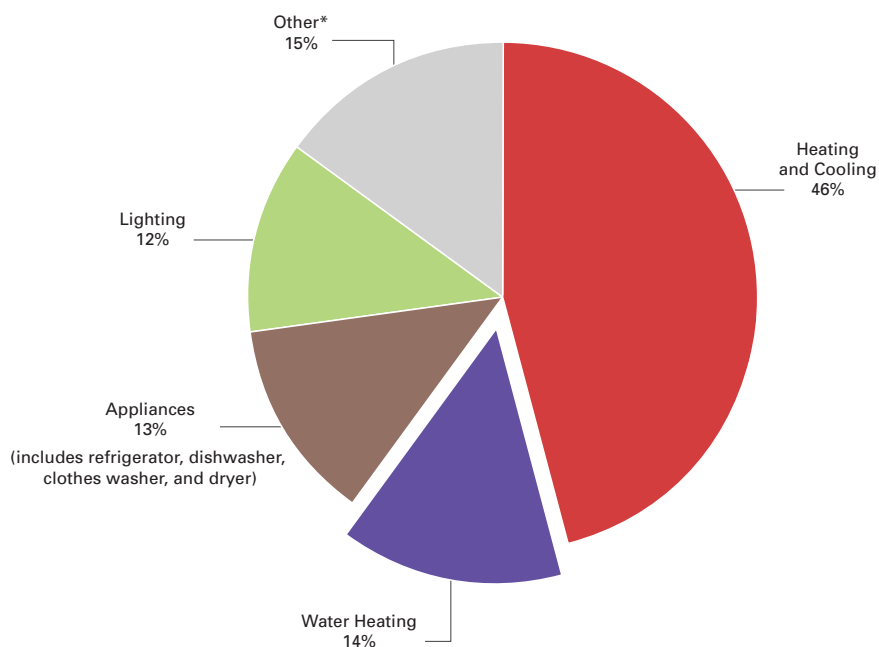
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ENERGY STAR is a government-backed program that helps consumers identify the most energy-efficient products.

CHANGING CONSUMER EXPECTATIONS

The cost of hot water heating is often overlooked in our modern lives. Although water heating represents the second largest energy expense in U.S. households, energy-saving technologies have only just begun to penetrate the market. Since consumers have largely accepted inefficient water heaters as a fact of life, changing expectations will require broad promotion of new technologies that can shave anywhere from 7 to 55 percent off household water heating costs.

WHERE DOES MY MONEY GO?



*Other includes computers, monitors, TVs, DVD players, external power adapters, telephony, set-top boxes, ceiling fans, vent fans, home audio, and small appliances like coffee makers and dehumidifiers.

Source: Lawrence Berkeley National Laboratory, 2009.

SECTION I: CONSUMER INFORMATION—DRIVING CONSUMER DEMAND

DID YOU KNOW?

The water heaters in 27 million households are more than 10 years old.

PERFORMANCE AND PEACE OF MIND

One of the many benefits of ENERGY STAR is the peace of mind that labeled products provide. In addition to the energy savings, every ENERGY STAR qualified water heater must come with a minimum warranty from the manufacturer and comply with well-established safety and quality standards. Each of the five eligible technologies offer efficiency with no reduction in available hot water. When you buy your next water heater, choose ENERGY STAR for performance and peace of mind.

THE POWER OF CHOICE

If yours is one of the 27 million households with a storage water heater that's more than 10 years old, replace it with an ENERGY STAR qualified model before it fails. The average storage water heater lasts about 13 years, but once yours starts to leak, it's already too late to compare prices and benefits. Odds are you'll end up with whatever water heater your plumber happens to have in the truck. By acting while your old water heater is still functional, you'll not only avoid having to clean up a flood in the basement or garage, but you'll also have more technology options. Start saving money now with an ENERGY STAR qualified water heater and get peace of mind for years to come.





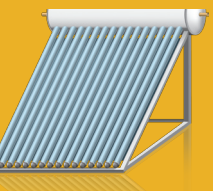
REPLACE YOUR WATER HEATER BEFORE IT FAILS



Nearly 2.5 million water heaters will fail this year, leaving their owners without hot water (and wet basements).

Don't get stuck with another inefficient water heater. If your water heater is more than 10 years old, replace it now, and start saving money right away!

SECTION I: CONSUMER INFORMATION—WATER HEATER TECHNOLOGIES AT A GLANCE

 High-Efficiency Gas Storage	Estimated Installed Cost	\$800-\$1,000	Details This inexpensive upgrade to the standard gas storage water heater carries a minimal cost premium and offers modest savings. Special Considerations None
	Typical Annual Savings ¹	\$30	
	Estimated Percentage Energy Savings	7%	
	Payback Period	2-3 years	
	Average Lifetime	13 years	
 Gas Condensing	Estimated Installed Cost	\$1,300-\$1,800	Details Significant advancements transfer much more of the heat from the flue gases into the water, leading to impressive efficiency gains. Special Considerations <ul style="list-style-type: none"> Requires condensate drain, electricity, and proper venting. Expected to be available in 2010.
	Typical Annual Savings ¹	\$110	
	Estimated Percentage Energy Savings	30%	
	Payback Period	4-9 years	
	Average Lifetime	15 years	
 Gas Tankless	Estimated Installed Cost ²	\$1,500-\$2,500	Details A more powerful burner heats water only when the faucet is turned on, which saves considerable energy by avoiding standby losses. Special Considerations <ul style="list-style-type: none"> Requires adequate gas lines for burner size, electricity, and proper venting. Flow rate is limited by burner size. Requires more maintenance than standard models.
	Typical Annual Savings ¹	\$115	
	Estimated Percentage Energy Savings	30%	
	Payback Period	5-15 years	
	Average Lifetime	20 years	
 Heat Pump	Estimated Installed Cost	\$1,200-\$1,800	Details Instead of creating heat, heat pumps transfer heat from the surrounding air to the water. The result is large gains in efficiency. Special Considerations <ul style="list-style-type: none"> Requires condensate drain and at least 1,000 cubic feet of space. May cause slightly increased heating costs during winter and slightly decreased cooling and dehumidification costs during summer.
	Typical Annual Savings ¹	\$290	
	Estimated Percentage Energy Savings	55%	
	Payback Period	2-4 years	
	Average Lifetime	10 years	
 Solar	Estimated Installed Cost ²	\$2,000-\$3,500	Details Collectors gather solar energy to heat water with no fuel costs. Backup systems ensure plenty of hot water on cloudy days. Special Considerations <ul style="list-style-type: none"> While solar water heaters can work in almost any climate, you will need ample access to sunlight, unobstructed by shade.
	Typical Annual Savings ³	\$195-\$270 ²	
	Estimated Percentage Energy Savings	50%	
	Payback Period	6-13 years	
	Average Lifetime	20 years	

¹ All savings calculations are based on hot water use of 64 gallons/day (typical of a four-person household) and utility rates of \$0.1109 per kWh and \$1.49 per therm.

² Installed cost reflects the cost after the Federal tax credit.

³ Savings from solar water heaters are different for systems with gas backup (which are assumed to replace gas storage water heaters) than for systems with electric backup (which are assumed to replace electric storage water heaters).

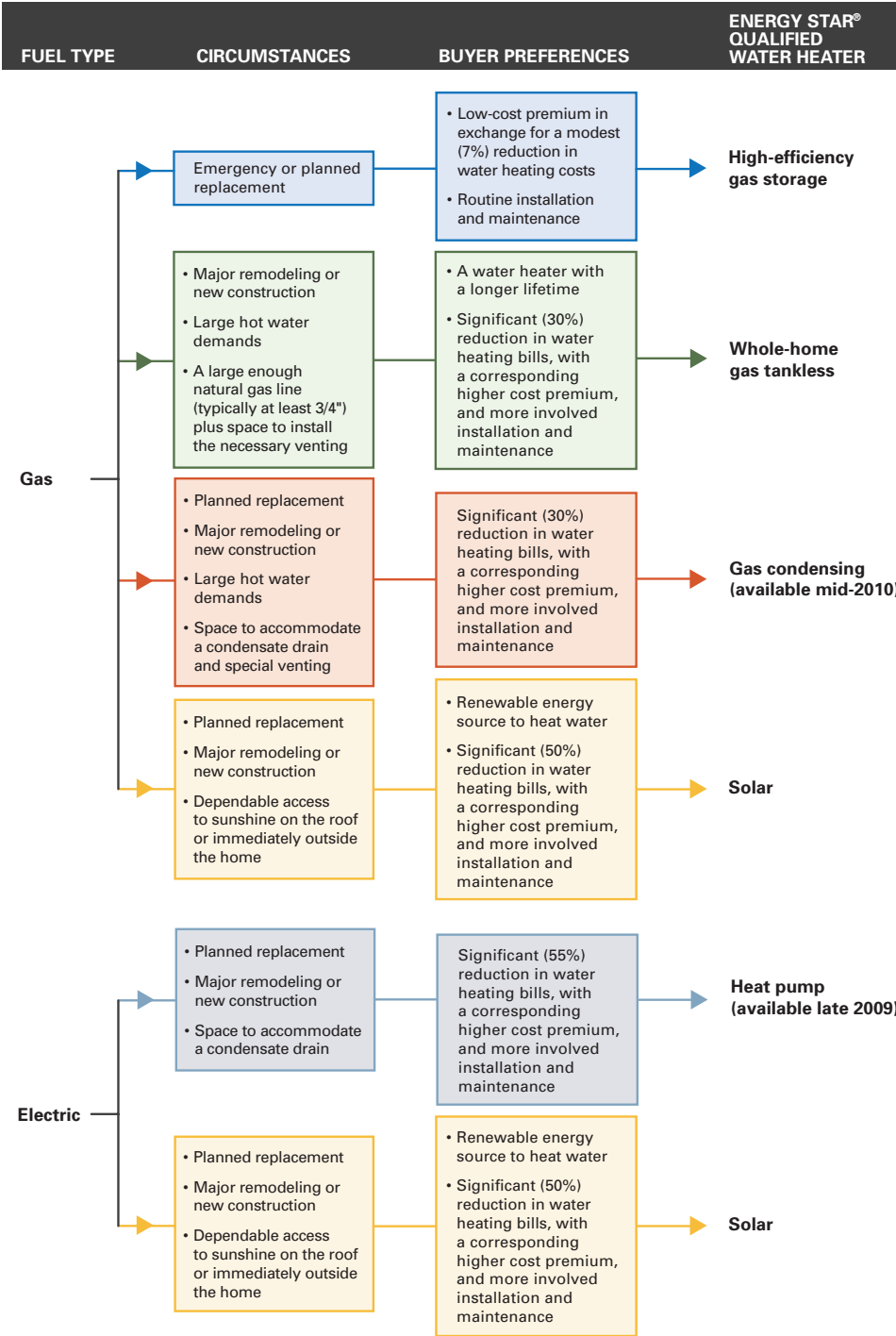
SECTION I: CONSUMER INFORMATION—CHOOSING THE RIGHT TECHNOLOGY

NEW SAVINGS

ENERGY STAR qualified water heaters offer energy savings from 7-55 percent.

WHICH TECHNOLOGY IS RIGHT FOR YOU?

Homeowners can now choose among five water heating technologies eligible for the ENERGY STAR. The best choice will depend on your current water heater, the circumstances of replacement, and personal preferences.



SECTION I: CONSUMER INFORMATION—HIGH-EFFICIENCY GAS STORAGE

HOW IT WORKS

High-efficiency gas storage water heaters use the same technology as standard gas storage water heaters: a burner at the bottom of a glass-lined steel tank heats the tank. A few basic changes make them more efficient: high-efficiency models have better insulation and more efficient burners, improvements that have a modest impact on price.

THE SAVINGS

ENERGY STAR qualified tankless water heaters save the typical family of four more than \$30 per year on gas bills compared to a standard storage model. Over the 13-year average lifetime of the unit, that's \$360. If you're looking for a simple upgrade, ENERGY STAR qualified high-efficiency models are an easy way to get water heating savings of about 7 percent.

IDEAL APPLICATIONS

Because of the low cost premium and lack of installation barriers, high-efficiency gas storage models are ideal replacements for standard gas storage models, especially for emergency replacement. Although qualified high-efficiency models are also suitable for new construction and major remodeling, more advanced technologies offer greater energy savings potential in those environments.

MAINTENANCE

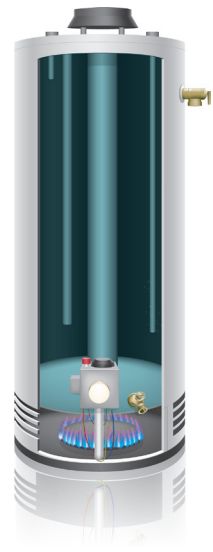
As high-efficiency gas storage water heaters are simply improved versions of regular water heaters, they require no special maintenance.

INSTALLED COST

While prices will vary, the installed cost for qualified high-efficiency water heaters is generally between \$800 and \$1,000.

SPECIAL CONSIDERATIONS

Could you save more? An ENERGY STAR qualified high-efficiency gas water heater is an inexpensive, energy-saving, and easily installed product. The only consideration is whether a more efficient technology is an option for your home.



LIFETIME

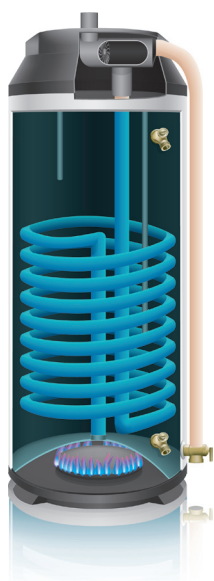
The useful lifetime for a high-efficiency storage tank is usually 12-13 years.

AVAILABILITY

Qualified high-efficiency water heaters are currently available through retailers and wholesale distributors.

FUN FACTS

- ENERGY STAR qualified gas storage water heaters save about 20 therms annually. That's enough energy to operate a gas oven for nearly six months.¹
- If everyone in the United States purchased a qualified gas storage model this year instead of a standard gas water heater, we would prevent nearly one billion pounds of carbon dioxide from entering the atmosphere, the equivalent of planting about 130,000 acres of trees.²



TAX CREDIT

Some ENERGY STAR qualified gas condensing water heaters may be eligible for a federal tax credit of 30% of the installed cost, up to \$1,500. Look for more information once products become available.

LIFETIME

Qualified gas condensing units are expected to last up to 15 years.

AVAILABILITY

The first qualified gas condensing models are expected to arrive on the market by mid-2010.

FUN FACT

The smart design enhancement that increases the efficiency of gas condensing water heaters can reduce your natural gas bills by more than \$100 each year. That's like getting a year's supply of shampoo and dishwashing soap for free.

HOW IT WORKS

While gas condensing water heaters work much like regular gas water heaters, design enhancements significantly increase efficiency and performance. Think of this water heater as a water tank sitting atop a gas fireplace, with the chimney running straight up the middle, exiting at the top. In a gas condensing water heater, the "chimney," or flue, spirals through the tank. Since the heat has much farther to travel before it exits the tank, more heat is transferred to the water.

THE SAVINGS

The smart design that increases the efficiency of gas condensing water heaters can reduce your natural gas bills by 30 percent, or more than \$100 a year.

IDEAL APPLICATIONS

This technology may be ideal for new homes and during major home remodeling. However, installing an ENERGY STAR qualified gas condensing unit requires careful planning. These water heaters are likely to be impractical for emergency replacement.

MAINTENANCE

Gas condensing water heaters will have basic maintenance tasks, similar to high-efficiency gas storage models. Consult the manufacturer guidelines for information about maintenance.

INSTALLED COST

Though these models have yet to arrive on the market, gas condensing units are expected to have installed costs between \$1,300 and \$1,800.

SPECIAL CONSIDERATIONS

- **CONDENSATE DRAIN:** Gas condensing models draw so much heat from the combustion gases that they condense and therefore require a drain for the liquid. If your current water heater doesn't have proximity to a drain, this may add to installation costs.
- **VENTING AND POWER:** Since the combustion gases of gas condensing models impart more of their heat to the water, they require special venting. These vents will also have a fan that helps draw the exhaust through the system, which means that your water heater will need to have access to electricity. Adding vents and electrical access will also add to installation costs in retrofits.

SECTION I: CONSUMER INFORMATION—WHOLE-HOME GAS TANKLESS

HOW IT WORKS

Whole-home gas tankless water heaters heat water like standard gas water heaters, but without a storage tank. They save energy by heating water only when needed, eliminating energy lost during standby. When a hot water tap is turned on, cold water is drawn into the water heater, the gas burner is activated, and hot water is delivered to the faucet.

THE SAVINGS

By heating water only when needed, tankless water heaters save about 30 percent on water heating costs—or about \$115 annually for a typical family of four. With a life expectancy of about 20 years, ENERGY STAR qualified tankless water heaters will have a lifetime savings of over \$2,000.

IDEAL APPLICATIONS

Qualified tankless models are ideal for new construction. They are also a good option for planned replacement.

MAINTENANCE

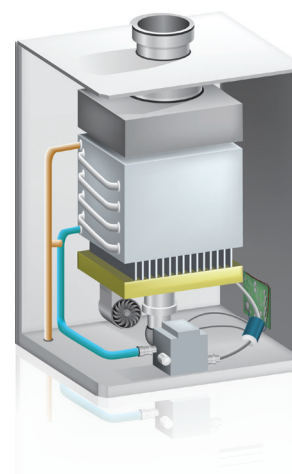
Tankless models typically have a much longer lifetime than traditional storage models. The longer life, however, will only be realized with regular maintenance. Mineral build-up in the water will decrease performance. The harder the water, the more frequently a tankless model will need to be flushed. In most cases, the homeowner or plumber will flush the unit with an acidic fluid such as vinegar to remove build-up.

INSTALLED COST

Typically, a tankless model will cost between \$1,500 and \$2,500 installed. Installation costs may be more if significant work is required to upgrade gas lines or venting.

SPECIAL CONSIDERATIONS

- **FLOW RATE:** A minimum stream of water must be drawn at the tap before a tankless water heater will ignite its burner. Along the same lines, tankless water heaters can only produce a certain amount of hot water at a given time. When purchasing a unit, tell your plumber or contractor the number of hot water fixtures you typically run simultaneously so that they can install a unit that's the right size for your household.
- **GAS LINES:** Because they heat water on demand, tankless water heaters need larger gas lines than traditional water heaters. A general rule of thumb



TAX CREDIT

All ENERGY STAR qualified gas tankless water heaters qualify for a federal tax credit of 30% of the installed cost, up to \$1,500.

LIFETIME

With proper maintenance, tankless water heaters are expected to last about 20 years.

AVAILABILITY

Gas tankless water heaters are currently available through retailers and wholesale distributors.

FUN FACT

Replacing your old gas water heater with an ENERGY STAR qualified gas tankless model will save you 103 therms of natural gas a year. That's enough energy to run a gas dryer for nearly four years.³

is that gas lines less than $\frac{3}{4}$ " in diameter will require replacement. Replacing your gas lines will add significant expense to the installation of a tankless water heater, so check with your contractor to determine if your gas lines are adequate.

- **VENTING:** Since the burners for gas tankless models are bigger, stainless steel vents for the exhaust need to be appropriately sized as well. Check with your contractor to determine if your vents are adequate, as adding new vents will also add to installation costs.
- **ELECTRIC IGNITION:** Most ENERGY STAR qualified models will require electricity to ignite the burner, so the water heater will need access to the electrical system. Keep in mind that when your power goes out, your hot water will too.

SECTION I: CONSUMER INFORMATION—HEAT PUMP

HOW IT WORKS

Heat pump water heater (HPWH) technology uses electricity to move heat from the surrounding air to the stored water. Imagine a refrigerator working in reverse: while a refrigerator removes heat from an enclosed box and expels it into the surrounding air, a HPWH takes the heat from surrounding air and transfers it to water in an enclosed tank.

THE SAVINGS

ENERGY STAR qualified HPWHs can save the average household almost \$300 per year on its electric bills compared to a standard electric water heater. This new technology can cut a water heating bill in half.

IDEAL APPLICATIONS

Qualified HPWHs are ideal for new construction and planned retrofits in homes with electric water heating. The special considerations can make it difficult to use this technology for an emergency replacement.

MAINTENANCE

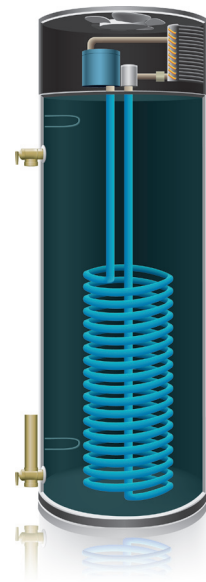
Clean and replace the filter based on the manufacturer guidelines. The filter should last as long as the unit.

INSTALLED COST

Installed cost is anticipated to be \$1,200 to \$1,800.

SPECIAL CONSIDERATIONS

- **COOL AIR EXHAUST:** HPWHs emit a modest amount of cool air exhaust. If your HPWH is in a living space, you may experience air conditioning benefits in the summer and a marginal heating penalty in the winter.
- **CONDENSATE DRAIN:** Just like an air conditioner, HPWHs also dehumidify the air as they draw heat from it, which will be beneficial in humid climates. The water heater may require a drain for the condensation. If your current water heater doesn't have proximity to a drain, this may add to installation costs.
- **TEMPERATURE:** Once the temperature drops below about 40° F, some models may switch to traditional electric heating. Your heat pump may have difficulty taking heat from the surrounding air if it is installed in an environment that gets too cold, so don't install the unit outdoors in a cold climate.
- **AMPLE AIR FLOW:** HPWHs need a minimum amount of space with ample air flow around the unit to function properly. ENERGY STAR qualified HPWHs should be installed only in areas with at least 1,000 cubic feet of space. Utility closets do not provide enough airflow for the unit to work efficiently.



TAX CREDIT

All ENERGY STAR qualified heat pump water heaters will be eligible for a federal tax credit of 30% of the installed cost, up to \$1,500.

LIFETIME

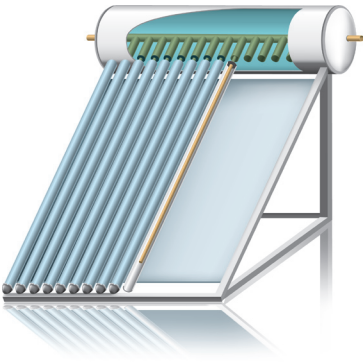
The anticipated lifetime of a heat pump water heater is about 10 years.

AVAILABILITY

Products will be available in fall 2009. Some manufacturers will be releasing products through just a few retailers and wholesale distributors; others will be releasing them more broadly.

FUN FACTS

- A new ENERGY STAR qualified heat pump water heater will save over 25,000 kWh of electricity over its lifetime. That's enough energy to light the average home for over 12 years.⁴
- If everyone buying an electric water heater this year chose an ENERGY STAR qualified heat pump model instead of a standard model, we would avoid 19.6 billion pounds of carbon dioxide emissions. That's like taking 1.6 million cars off the road.⁵



TAX CREDIT

All ENERGY STAR qualified solar water heaters qualify for a federal tax credit of 30% of the installed cost, with no upper limit.

LIFETIME

The solar system should last about 20 years, even in cold climates.

AVAILABILITY

Solar water heaters are currently available through distributors. For installation, find a contractor that is certified by the North American Board of Certified Energy Practitioners (NABCEP) if possible.

FUN FACTS

- Installing a qualified solar water heater will reduce the load of your electric water heater by almost 2,500 kWh per year, preventing nearly 4,000 pounds of carbon dioxide from entering the atmosphere annually. That's the equivalent of not driving your car about 3,000 miles every year.⁶
- Replacing your old gas water heater with an ENERGY STAR qualified solar water heater will save enough natural gas over the life of the unit to fuel your neighbor's old water heater for 10 years.⁷
- Upgrading is a bright idea: replacing your old electric water heater with an ENERGY STAR qualified solar water heater will save enough energy annually to light a 75-watt light bulb for nearly four years.⁸

HOW IT WORKS

Using heat from the sun can cut your water heating bill in half. Various types of ENERGY STAR qualified solar water heaters are available to meet a range of climate and household demands. In very warm climates, direct systems circulate water through solar collectors where it is heated directly by the sun. In locations that experience seasonal freezing, which is most of the United States, indirect systems use a heat exchanger to transfer the heat energy from the collector to the water heater. Solar water heaters that use freeze-resistant technologies are recommended for cold climates.

THE SAVINGS

ENERGY STAR qualified solar water heaters can save you about \$190-\$265 a year over a standard tank model.

IDEAL APPLICATIONS

An ENERGY STAR qualified solar water heater is ideal for those that want to heat their water with renewable energy. These systems are appropriate for new construction and planned replacements.

MAINTENANCE

In addition to the maintenance for the back-up water heater, debris that gathers on the panels needs to be removed to ensure that the collector is not shaded from the sun. Every five years, a qualified solar technician should perform a routine check of all the controls and valves.

INSTALLED COST

Installed costs typically range from \$2,000 to \$3,500. Generally, the colder the climate, the more expensive the solar water heater will be.

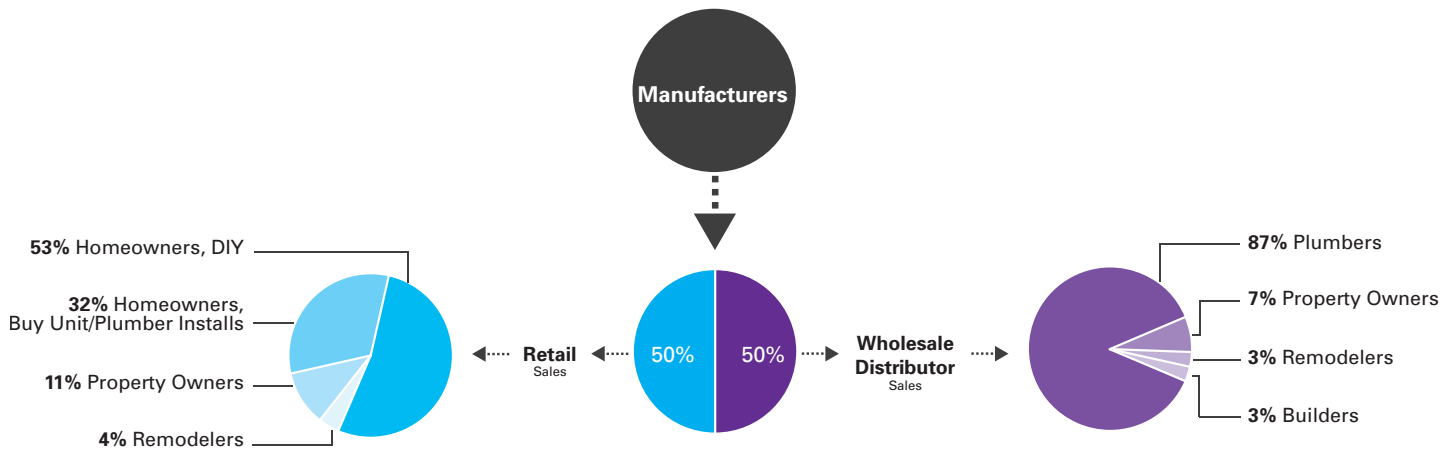
SPECIAL CONSIDERATIONS

- **GEOGRAPHIC LOCATION:** Your location determines the most appropriate solar technologies for your home. In very warm climates, passive systems can provide preheated water without the use of a refrigerant. In cold climates, a pump will transport freeze-resistant refrigerant to the tank.
- **BACKUP HEATER:** ENERGY STAR only qualifies complete systems that come with a backup gas or electric water heater. The backup system ensures that even on the cloudiest days, your household has enough hot water.

SECTION II: MARKET INFORMATION

SALES CHANNELS

Half of all water heaters are sold through retailers and half through wholesale distributors. Influencing both sales channels to carry and promote ENERGY STAR qualified products will be key to successfully transforming the market.

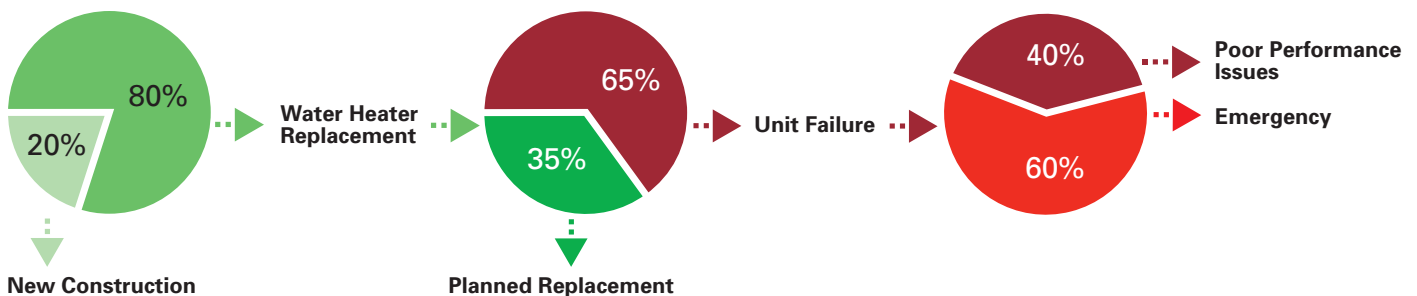


REASONS FOR PURCHASE

A failed unit is the leading reason for water heater sales. Unit failure often leads to rushed replacements rather than carefully considered purchases. Understanding the circumstances of water heater purchases is also key to successful market transformation.

WHY DO PEOPLE BUY WATER HEATERS?

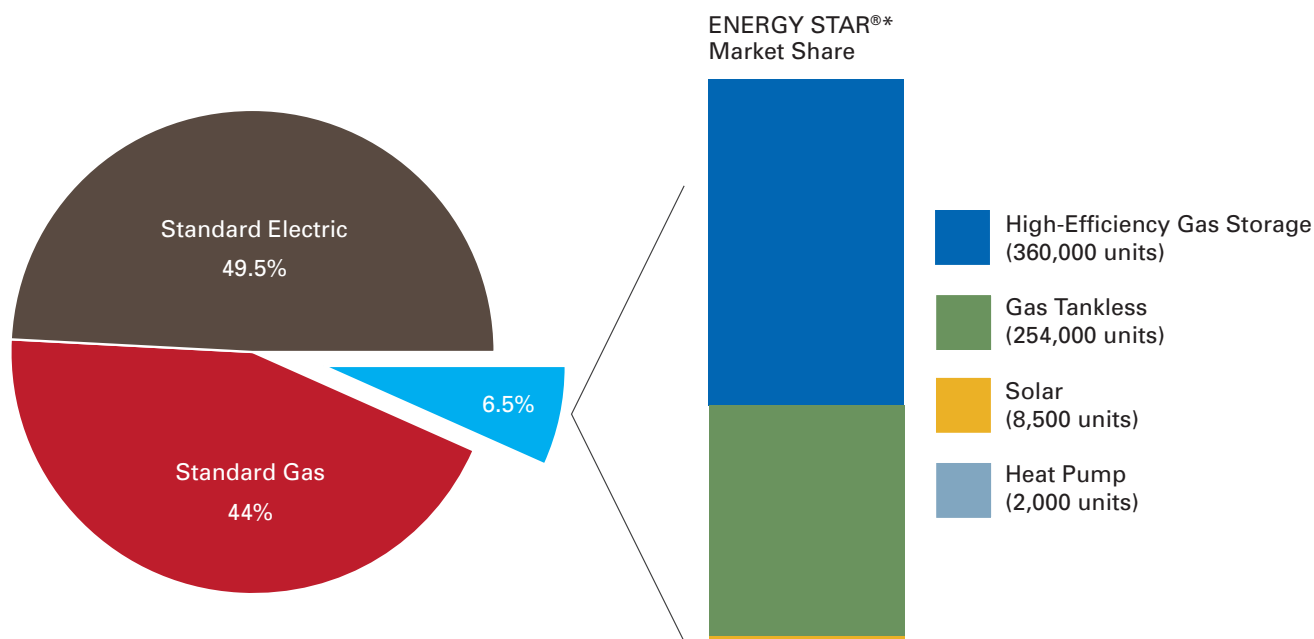
ALL WATER HEATER SALES



SECTION II: MARKET INFORMATION—MARKET SHARE AND SAVINGS POTENTIAL

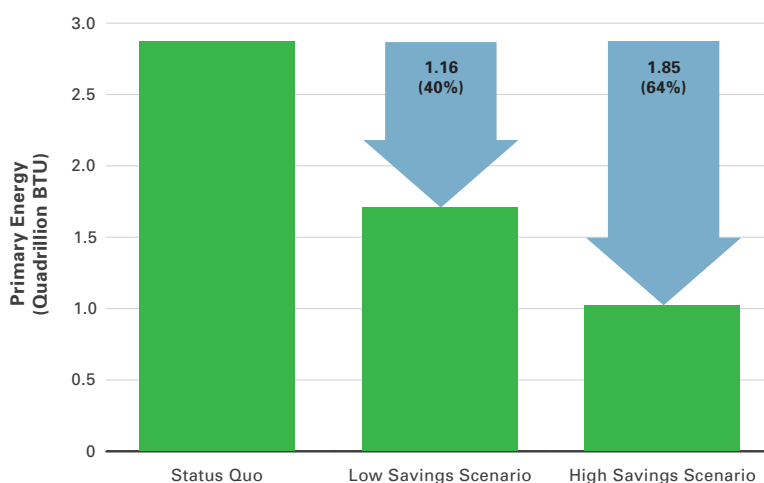
ENERGY STAR qualified water heaters currently account for only 6 to 7 percent of sales and less than 1 percent of the installed base. If all homes had ENERGY STAR qualified models, the United States could save 1 billion to 6.8 billion therms, 98 billion to 107 billion kWh, and \$12 billion to \$22 billion, depending on technology choices. This is 1.16 to 1.85 quadrillion BTU per year of primary energy, a 40 to 64 percent savings.⁹

WATER HEATER MARKET SHARE BY TECHNOLOGY, 2006



*“ENERGY STAR Market Share” estimates portion of market sales that would have qualified for ENERGY STAR had the program been in place at that time.
Source: ENERGY STAR Residential Water Heaters: Final Criteria Analysis, April 1, 2008.

ENERGY SAVINGS POTENTIAL FROM ENERGY STAR WATER HEATERS



Note: Assumes 52.5 million gas homes acquire high-efficiency gas storage units (EF=0.62) in the low savings scenario and solar water heaters with gas backup in the high savings scenario. Assumes 40.3 million electric homes acquire solar water heaters with electric backup in the low savings scenario and heat pump water heaters in the high savings scenario. Estimates of primary energy savings potential assume a 3.18 site-to-source conversion factor for electricity.

Source: Analysis by D&R International, Ltd., using data from Energy Information Administration, 2009.

SECTION II: MARKET INFORMATION—ENERGY STAR CRITERIA

The ENERGY STAR criteria for residential water heaters specify the minimum requirements for each technology type.

ENERGY STAR CRITERIA				
	ENERGY FACTOR	FIRST HOUR RATING	WARRANTY	SAFETY
Gas Storage Phase I (ending 8/31/2010)	≥ 0.62	FHR ≥ 67 gallons per hour	6 years on tank and parts	ANSI Z21.10.1/ CSA 4.1
Gas Storage Phase II (beginning 9/1/2010)	≥ 0.67	FHR ≥ 67 gallons per hour	6 years on tank and parts	ANSI Z21.10.1/ CSA 4.1
Gas Condensing	≥ 0.80	FHR ≥ 67 gallons per hour	8 years on tank and parts	ANSI Z21.10.1/ CSA 4.1
Whole-Home Gas Tankless	≥ 0.82	FHR ≥ 2.5 over a 77°F rise	10 years on heat exchanger and 5 years on parts	ANSI Z21.10.1/CSA 4.1 or ANSI Z21.10.3/CSA 4.3, depending on burner size
Heat Pump Water Heater	≥ 2.00	FHR ≥ 50 gallons per hour	6 years on tank and parts	UL 174 and UL 1995
Solar Water Heater	Solar Fraction ≥ 0.50	—	10 years on solar collector, 6 years on storage tank, 2 years on controls, and 1 year on piping and parts	OG-300 certification from the SRCC

ENDNOTES

- ¹ A typical gas oven consumes 41 therms of gas per year.
- ² Assumes 4.7 million gas water heater sales, 19 therms of savings per water heater, 11.75 pounds of carbon dioxide emissions per therm, and 8,066 pounds of carbon dioxide sequestered per acre of trees per year.
- ³ A standard gas dryer consumes 26 therms of gas per year.
- ⁴ An average household consumes about 2,100 kWh per year for lighting.
- ⁵ Assumes 4.8 million electric water heater sales, 1.54 pounds of carbon dioxide emissions per kWh, and 12,037 pounds of carbon dioxide emitted by the average car per year.
- ⁶ Assumes 1.54 pounds of carbon dioxide emissions per kWh, and 12,037 pounds of carbon dioxide emissions per year by the average car at 11,856 vehicle miles traveled per year.
- ⁷ Assumes neighbor's old water heater is a 50-gallon gas storage water heater with an energy factor of 0.525, using 64 gallons of hot water per day.
- ⁸ Assumes a 75-watt incandescent light bulb, on 24 hours a day, 365 days per year.
- ⁹ Analysis by D&R International, Ltd., using data from Energy Information Administration, Air-Conditioning Heating and Refrigeration Institute, and discussions with manufacturers, 2009.



U.S. DEPARTMENT OF
ENERGY

September 2009

For more information visit:
www.energystar.gov/waterheaters
1.888.STAR.YES (1.888.782.7937)